PA NT COOPERATION TREAT

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

To:

Assistant Commissioner for Patents
United States Patent and Trademark Office
Box PCT
Washington, D.C.20231
ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 12 September 2000 (12.09.00)	
International application No. PCT/NL00/00036	**Applicant's or agent's file reference** G PEM/MvZ/13
International filing date (day/month/year) 18 January 2000 (18.01.00)	**Priority date** (day/month/year) 21 January 1999 (21.01.99)
Applicant COBBEN, Johannes, Ignatius, Marie et al	

1. The designated Office is hereby notified of its election made:

[X] in the demand filed with the International Preliminary Examining Authority on:

16 August 2000 (16.08.00)

[ ] in a notice effecting later election filed with the International Bureau on:

2. The election [X] was

[ ] was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Facsimile No.: (41-22) 740.14.35

Authorized officer

Pascal Piriou

Telephone No.: (41-22) 338.83.38

PCT

REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

RECORD COPY

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PCT/NL 00/00036
International Application No.

18 JAN 2000 (18.01.00)
International Filing Date

BUREAU VOOR DE INDUSTRIËLE EIGENDOM
P.C.T. INTERNATIONAL APPLICATION
Name of receiving Office and "PCT International Application"

Applicant's or agent's file reference *(if desired) (12 characters maximum)* G PEM/MvZ/13

Box No. I TITLE OF INVENTION

Improved document made forge-proof by a perforation pattern

Box No. II APPLICANT

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)*

INDUSTRIAL AUTOMATION INTEGRATORS (IAI) B.V.
De Run 6509
NL-5504 DR VELDHOVEN
The Netherlands

☐ This person is also inventor.

Telephone No.

Facsimile No.

Teleprinter No.

State *(that is, country)* of nationality: The Netherlands (NL)

State *(that is, country)* of residence: The Netherlands (NL)

This person is applicant for the purposes of: ☐ all designated States ☒ all designated States except the United States of America ☐ the United States of America only ☐ the States indicated in the Supplemental Box

Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)*

ENSCHEDÉ/SDU B.V.
Jan van Krimpenweg 19
NL-2031 CG HAARLEM
The Netherlands

This person is:

☒ applicant only

☐ applicant and inventor

☐ inventor only *(If this check-box is marked, do not fill in below.)*

State *(that is, country)* of nationality: The Netherlands (NL)

State *(that is, country)* of residence: The Netherlands (NL)

This person is applicant for the purposes of: ☐ all designated States ☒ all designated States except the United States of America ☐ the United States of America only ☐ the States indicated in the Supplemental Box

☒ Further applicants and/or (further) inventors are indicated on a continuation sheet.

Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE

The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as: ☒ agent ☐ common representative

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

EVELEENS MAARSE, Pieter
ARNOLD & SIEDSMA
Sweelinckplein 1
NL-2517 GK THE HAGUE
The Netherlands

Telephone No. 076-5214936

Facsimile No. 076-5219017

Teleprinter No.

☐ **Address for correspondence:** Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

Continuation of Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

If none of the following sub-boxes is used, this sheet should not be included in the request.

Name and address: *(Family name followed by given name: for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)*

COBBEN, Johannes Ignatius Marie
Berthastraat 11
NL-5507 LT VELDHOVEN
The Netherlands

This person is:
- [ ] applicant only
- [X] applicant and inventor
- [ ] inventor only *(If this check-box is marked, do not fill in below.)*

State *(that is, country)* of nationality: The Netherlands (NL)

State *(that is, country)* of residence: The Netherlands (NL)

This person is applicant for the purposes of:
- [ ] all designated States
- [ ] all designated States except the United States of America
- [XX] the United States of America only
- [ ] the States indicated in the Supplemental Box

Name and address: *(Family name followed by given name: for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)*

AUGUSTINUS, Arnoud
Heilige Geeststraat 2
NL-5521 LC EERSEL
The Netherlands

This person is:
- [ ] applicant only
- [X] applicant and inventor
- [ ] inventor only *(If this check-box is marked, do not fill in below.)*

State *(that is, country)* of nationality: The Netherlands (NL)

State *(that is, country)* of residence: The Netherlands (NL)

This person is applicant for the purposes of:
- [ ] all designated States
- [ ] all designated States except the United States of America
- [XX] the United States of America only
- [ ] the States indicated in the Supplemental Box

Name and address: *(Family name followed by given name: for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)*

VAN DEN BERG, Jan
Bloklandpolderstraat 15
NL-2807 LH GOUDA
The Netherlands

This person is:
- [ ] applicant only
- [XX] applicant and inventor
- [ ] inventor only *(If this check-box is marked, do not fill in below.)*

State *(that is, country)* of nationality: The Netherlands (NL)

State *(that is, country)* of residence: The Netherlands (NL)

This person is applicant for the purposes of:
- [ ] all designated States
- [ ] all designated States except the United States of America
- [X] the United States of America only
- [ ] the States indicated in the Supplemental Box

Name and address: *(Family name followed by given name: for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)*

This person is:
- [ ] applicant only
- [ ] applicant and inventor
- [ ] inventor only *(If this check-box is marked, do not fill in below.)*

State *(that is, country)* of nationality:

State *(that is, country)* of residence:

This person is applicant for the purposes of:
- [ ] all designated States
- [ ] all designated States except the United States of America
- [ ] the United States of America only
- [ ] the States indicated in the Supplemental Box

- [ ] Further applicants and/or (further) inventors are indicated on another continuation sheet.

Box No.V DESIGNATION OF STATES

The following designations are hereby made under Rule 4.9(a) *(mark the applicable check-boxes; at least one must be marked)*:

Regional Patent

- ☐ **AP** **ARIPO Patent:** GH Ghana, GM Gambia, KE Kenya, LS Lesotho, MW Malawi, SD Sudan, SL Sierra Leone, SZ Swaziland, TZ United Republic of Tanzania, UG Uganda, ZW Zimbabwe, and any other State which is a Contracting State of the Harare Protocol and of the PCT
- ☐ **EA** **Eurasian Patent:** AM Armenia, AZ Azerbaijan, BY Belarus, KG Kyrgyzstan, KZ Kazakhstan, MD Republic of Moldova, RU Russian Federation, TJ Tajikistan, TM Turkmenistan, and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT
- ☒ **EP** **European Patent:** AT Austria, BE Belgium, CH and LI Switzerland and Liechtenstein, CY Cyprus, DE Germany, DK Denmark, ES Spain, FI Finland, FR France, GB United Kingdom, GR Greece, IE Ireland, IT Italy, LU Luxembourg, MC Monaco, NL Netherlands, PT Portugal, SE Sweden, and any other State which is a Contracting State of the European Patent Convention and of the PCT
- ☐ **OA** **OAPI Patent:** BF Burkina Faso, BJ Benin, CF Central African Republic, CG Congo, CI Côte d'Ivoire, CM Cameroon, GA Gabon, GN Guinea, GW Guinea-Bissau, ML Mali, MR Mauritania, NE Niger, SN Senegal, TD Chad, TG Togo, and any other State which is a member State of OAPI and a Contracting State of the PCT *(if other kind of protection or treatment desired, specify on dotted line)* .....

National Patent *(if other kind of protection or treatment desired, specify on dotted line)*:

- ☐ **AE** United Arab Emirates
- ☐ **AL** Albania
- ☐ **AM** Armenia
- ☐ **AT** Austria
- ☐ **AU** Australia
- ☐ **AZ** Azerbaijan
- ☐ **BA** Bosnia and Herzegovina
- ☐ **BB** Barbados
- ☐ **BG** Bulgaria
- ☐ **BR** Brazil
- ☐ **BY** Belarus
- ☒ **CA** Canada
- ☐ **CH and LI** Switzerland and Liechtenstein
- ☒ **CN** China
- ☐ **CR** Costa Rica
- ☐ **CU** Cuba
- ☐ **CZ** Czech Republic
- ☐ **DE** Germany
- ☐ **DK** Denmark
- ☐ **DM** Dominica
- ☐ **EE** Estonia
- ☐ **ES** Spain
- ☐ **FI** Finland
- ☐ **GB** United Kingdom
- ☐ **GD** Grenada
- ☐ **GE** Georgia
- ☐ **GH** Ghana
- ☐ **GM** Gambia
- ☐ **HR** Croatia
- ☐ **HU** Hungary
- ☐ **ID** Indonesia
- ☐ **IL** Israel
- ☐ **IN** India
- ☐ **IS** Iceland
- ☒ **JP** Japan
- ☐ **KE** Kenya
- ☐ **KG** Kyrgyzstan
- ☐ **KP** Democratic People's Republic of Korea
- ☐ **KR** Republic of Korea
- ☐ **KZ** Kazakhstan
- ☐ **LC** Saint Lucia
- ☐ **LK** Sri Lanka
- ☐ **LR** Liberia
- ☐ **LS** Lesotho
- ☐ **LT** Lithuania
- ☐ **LU** Luxembourg
- ☐ **LV** Latvia
- ☐ **MA** Morocco
- ☐ **MD** Republic of Moldova
- ☐ **MG** Madagascar
- ☐ **MK** The former Yugoslav Republic of Macedonia
- ☐ **MN** Mongolia
- ☐ **MW** Malawi
- ☐ **MX** Mexico
- ☐ **NO** Norway
- ☐ **NZ** New Zealand
- ☐ **PL** Poland
- ☐ **PT** Portugal
- ☐ **RO** Romania
- ☒ **RU** Russian Federation
- ☐ **SD** Sudan
- ☐ **SE** Sweden
- ☐ **SG** Singapore
- ☐ **SI** Slovenia
- ☐ **SK** Slovakia
- ☐ **SL** Sierra Leone
- ☐ **TJ** Tajikistan
- ☐ **TM** Turkmenistan
- ☐ **TR** Turkey
- ☐ **TT** Trinidad and Tobago
- ☐ **TZ** United Republic of Tanzania
- ☐ **UA** Ukraine
- ☐ **UG** Uganda
- ☒ **US** United States of America
- ☐ **UZ** Uzbekistan
- ☐ **VN** Viet Nam
- ☐ **YU** Yugoslavia
- ☐ **ZA** South Africa
- ☐ **ZW** Zimbabwe

Check-boxes reserved for designating States which have become party to the PCT after issuance of this sheet:

- ☐ .....
- ☐ .....

Precautionary Designation Statement: In addition to the designations made above, the applicant also makes under Rule 4.9(b) all other designations which would be permitted under the PCT except any designation(s) indicated in the Supplemental Box as being excluded from the scope of this statement. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit. *(Confirmation (including fees) must reach the receiving Office within the 15-month time limit.)*

Box No. VI PRIORITY CLAIM ☐ Further priority claims are indicated in the Supplemental Box.

Filing date of earlier application (day/month/year)	Number of earlier application	Where earlier application is: national application: country	regional application:* regional Office	international application: receiving Office
item (1) 21 January 1999 (21.01.1999)	1011103	NL		
item (2) 28 June 1999 (28.06.1999)	1012460	NL		
item (3)				

☒ The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) *(only if the earlier application was filed with the Office which for the purposes of the present international application is the receiving Office)* identified above as item(s): (2)

* *Where the earlier application is an ARIPO application, it is mandatory to indicate in the Supplemental Box at least one country party to the Paris Convention for the Protection of Industrial Property for which that earlier application was filed (Rule 4.10(b)(ii)). See Supplemental Box.*

Box No. VII INTERNATIONAL SEARCHING AUTHORITY

Choice of International Searching Authority (ISA) *(if two or more International Searching Authorities are competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used):* ISA/

Request to use results of earlier search; reference to that search *(if an earlier search has been carried out by or requested from the International Searching Authority):*

Date (day/month/year)	Number	Country (or regional Office)
21 January 1999 (21.01.1999)	SN 32536	NL

Box No. VIII CHECK LIST; LANGUAGE OF FILING

This international application contains the following **number of sheets**:

request	: 4
description (excluding sequence listing part)	: 99
claims	: 3
abstract	: 1
drawings	: 1
sequence listing part of description	:
Total number of sheets	18

This international application is **accompanied** by the item(s) marked below:

1. ☒ fee calculation sheet
2. ☐ separate signed power of attorney
3. ☐ copy of general power of attorney; reference number, if any:
4. ☐ statement explaining lack of signature
5. ☒ priority document(s) identified in Box No. VI as item(s): (2)
6. ☐ translation of international application into (language):
7. ☐ separate indications concerning deposited microorganism or other biological material
8. ☐ nucleotide and/or amino acid sequence listing in computer readable form
9. ☒ other *(specify)*: priority document NL 1011103

Figure of the drawings which should accompany the abstract: 1

Language of filing of the international application: English

Box No. IX SIGNATURE OF APPLICANT OR AGENT

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request).

EVELEENS MAARSE, Pieter

For receiving Office use only

1. Date of actual receipt of the purported international application:	18 JAN 2000 (18.01.00)	2. Drawings: ☒ received: ☐ not received:
3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:		
4. Date of timely receipt of the required corrections under PCT Article 11(2):		
5. International Searching Authority (if two or more are competent): ISA/	6. ☐ Transmittal of search copy delayed until search fee is paid.	

For International Bureau use only

Date of receipt of the record copy by the International Bureau: 23 FEBRUARY 2000 (23.02.00)

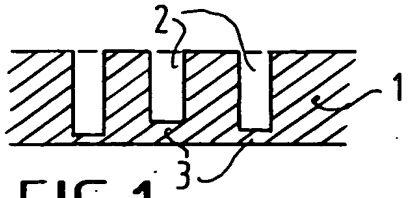

FIG.1

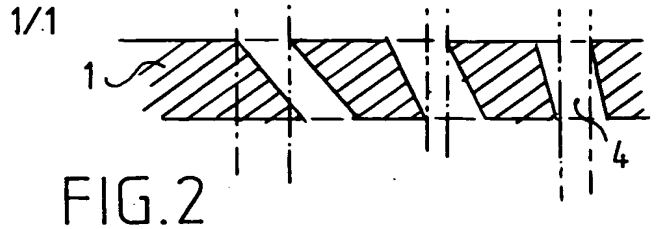

FIG.2

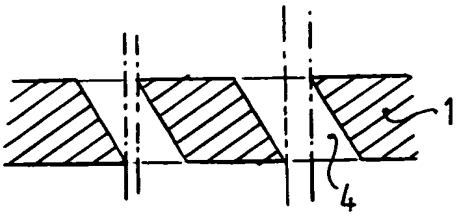

FIG.3

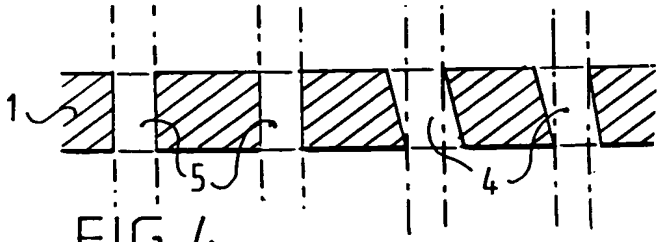

FIG.4

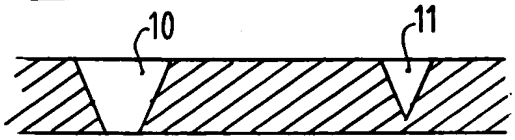

FIG.5

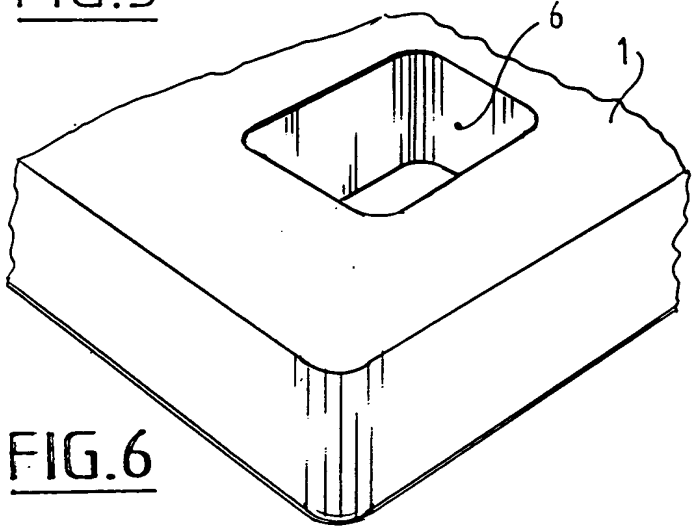

FIG.6

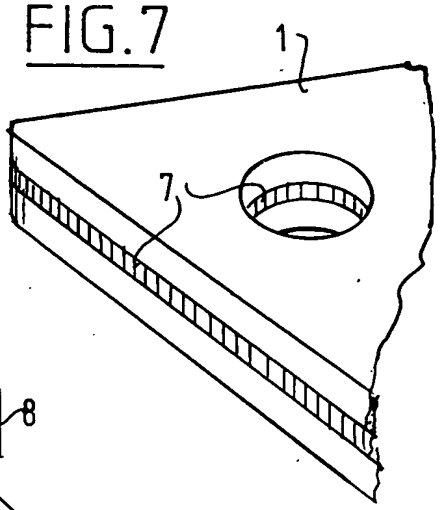

FIG.7

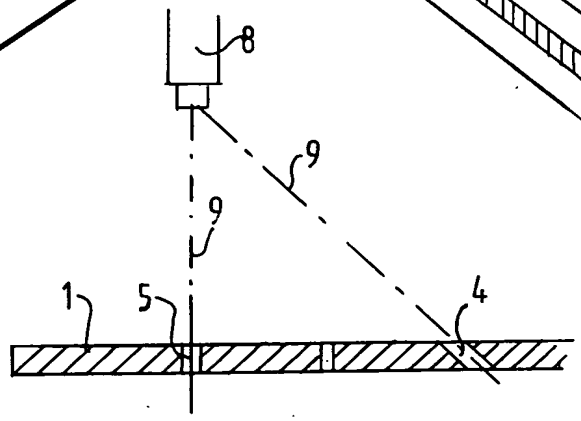

FIG.8

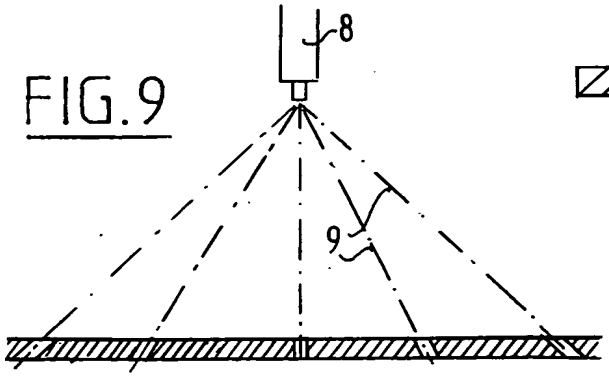

FIG.9

G PEM/MvZ/13

VERBETERD, DOOR MIDDEL VAN EEN PERFORATIEPATROON TEGEN VERVALSING BESTENDIG DOCUMENT

De onderhavige uitvinding heeft betrekking op een tegen vervalsing bestendig document, omvattende een veiligheidskenmerk in de vorm van een perforatiepatroon bij beschouwing tegen een heldere achtergrond grijstinten te zien geeft.

Een dergelijk document is bekend uit WO98/19869.

Alhoewel het desbetreffende, tot de stand van de techniek behorende document een zeer goede beveiliging tegen vervalsing biedt, wordt het, in verband met de technische mogelijkheden van vervalsers, van belang nieuwe beveiligingskenmerken te ontwikkelen.

Hiertoe verschaft de onderhavige uitvinding de maatregel dat het document is vervaardigd van in een beperkte mate licht doorlatend materiaal, dat de perforatie slechts over een deel van de dikte van het document ter plaatse van de perforatie uitstrekt, en dat de dikte van het resterende deel van het document ter plaatse van de perforatie volgens het weer te geven beeld is gemoduleerd.

Deze maatregel leidt tot een verdergaande moeilijkheidsgraad; de bepalende factor voor het weergeven van de grijstint van de perforatie en daarmee van de afbeelding wordt bepaald door de resterende dikte van het document. Dit betekent dat de diepte van de niet-doorgaande perforatie zeer nauwkeurig moet worden bepaald. De resulterende dikte is immers het verschil tussen twee grotere waarden, namelijk de dikte van het totale document en de diepte van de perforatie.

Volgens een andere, onafhankelijke maatregel volgens de uitvinding strekt de perforatie zich uit onder een van 90° verschillende hoek ten opzichte van het hoofdvlak van het document. Dit heeft tot gevolg dat de

perforatie niet met zeer kleine boortjes kan worden aangebracht, maar dat gebruik gemaakt zal moeten worden van een laser, welke enerzijds een hoge investering vereist, en welke anderzijds een hoge mate van technische kennis vereist.

Deze wijze van aanbrengen biedt de mogelijkheid de hoek te moduleren voor het verkrijgen van een grijswaarde-modulatie.

Bovendien bestaat, evenals bij de klassieke, rechte perforaties, de mogelijkheid de dichtheid van de perforatie of de grootte, dat wil zeggen de diameter ervan, te moduleren.

Bij voorkeur betreft de perforatie een afbeelding.

Hierbij wordt opgemerkt dat de afbeelding, zoals deze door middel van perforatie wordt aangebracht, aan een zekere mate van beeldbewerking onderworpen kan zijn. Hiermee is het mogelijk de door de noodzakelijke kwantisatie verloren gegane kenmerken van de afbeelding te compenseren. Een voorbeeld van een dergelijke beeldbewerking is "contour enhancement".

Overigens is de uitvinding tevens toepasbaar op perforatiepatronen die geen afbeelding representeren, maar die een alfanummerieke expressie of een code representeren.

Het is duidelijk dat een combinatie van deze mogelijkheden kan worden toegepast. Uiteraard kan een dergelijke schuine perforatie gecombineerd worden met een normale, rechte perforatie. Deze combinatie biedt de mogelijkheid een extra patroon in te voeren. Hierbij wordt bijvoorbeeld de hoofdafbeelding, welke gemoduleerd is voor het weergeven van grijstinten, met een rechte perforatie aangebracht, terwijl een extra kenmerk, bijvoorbeeld in de vorm van een logo of letters, schuin is aangebracht. De keuze van de hoek of andere eigenschappen van de schuine perforatie kunnen zodanig zijn gekozen, dat bij het normaal, onder een hoek van ongeveer 90° waarnemen van het patroon de normale afbeelding

verschijnt, en dat bij het waarnemen onder een andere hoek de tweede afbeelding in de vorm van een logo of een lettercombinatie zichtbaar wordt.

Een ander voorbeeld is het aanbrengen van twee beelden op dezelfde plaats op de drager, echter onder zodanig verschillende hoeken, dat elk oog zijn eigen beeld ziet, en dus een stereobeeld waargenomen wordt.

Het zal duidelijk zijn dat dit op talloze wijzen kan worden gevarieerd.

Hierbij is het aantrekkelijk gebruik te maken van een werkwijze, waarbij het te beveiligen document vanaf twee posities door een laserbron wordt bestraald. Uiteraard is het mogelijk hierbij gebruik te maken van twee laserbronnen, doch het is uiteraard eenvoudiger het document aanvankelijk in een eerste positie onder een eerste hoek door een laserbron te bestralen en het document vervolgens in een andere positie te plaatsen waarbij het onder een andere hoek door dezelfde laserbron wordt bestraald.

Wanneer de laserbron dicht bij het document wordt geplaatst, is het eveneens mogelijk een perforatie onder een van 90° verschillende hoek aan te brengen; dit wordt immers veroorzaakt door de kegel- of pyramidevorm waarbinnen de laserlichtbundel zich moet verplaatsen voor het aanbrengen van de perforatie. Er ontstaat dan een patroon dat met toenemende afstand tot het centrum van de afbeelding een toenemende hoek vertoont.

Volgens een andere voorkeursuitvoeringsvorm van de uitvinding is de doorsnede van de perforatie in zijn dwarsvlak ongelijk aan een cirkel. Het toepassen van een laserbron biedt bij een juiste besturing van de posities van de laserspot de mogelijkheid een dergelijke perforatie uit te voeren. Het is immers nagenoeg onmogelijk dit met mechanische middelen te verkrijgen, gezien de fijnheid van het vereiste patroon.

Volgens een andere voorkeursuitvoeringsvorm is in de representatie van het beeld een code verscholen. Hierbij kan men gebruik maken van de bij grafische tech-

nieken reeds toegepaste leer, volgens welke het mogelijk is in een beeld met het normale oog niet waarneembare veranderingen aan te brengen die na een specifieke bewerking leiden tot het weergeven van een code.

Anderzijds kan men ook kiezen voor een direct zichtbare codering. De code kan gebruikt worden om bijvoorbeeld de machine te identificeren, waarop het betreffende product aangemaakt werd. Zodoende kan bij misbruik van een machine de betreffende machine geïdentificeerd worden.

Volgens weer een andere uitvoeringsvorm is in het document een tussenliggende laag opgenomen, welke van een inkt voorzien is.

Het toepassen van laser biedt de mogelijkheid het materiaal, waarvan het document vervaardigd is, volledig weg te nemen, dat wil zeggen verbranden, verdampen, enzovoorts. Hierbij zal nauwelijks vervuiling van de betreffende lagen van het document plaatsvinden. Wanneer men een dergelijk document met mechanische middelen bewerkt, zal een mate van versmering optreden.

Dit is in het bijzonder goed waarneembaar, wanneer de inkt gevormd wordt door bij UV-licht gevoelige inkt.

Volgens een andere uitvoeringsvorm worden perforaties, die volgens een een beeld representerend patroon in een drager zijn aangebracht, opgevuld met een onder UV-licht oplichtende inkt. Een dergelijk patroon wordt zichtbaar, indien dit verlicht wordt met een UV-lichtbron.

In een andere uitvoeringsvorm worden de binnenkanten van de perforaties van een dergelijk patroon voorzien van een laag, bijvoorbeeld door een reflecterende metaallaag op te dampen, waardoor een in aanzicht zichtbare afbeelding ontstaat. Het selectief aanbrengen van een laag aan de binnenkant van alle perforaties is mogelijk door een verwijderbare folie aan te brengen, voordat de perforaties aangebracht worden en deze na het aanbrengen van de betreffende laag te verwijderen.

In een andere uitvoeringsvorm wordt uitgegaan van een drager die opgebouwd is uit materiaallagen van verschillende kleuren. Door de diepte te moduleren kan men de perforatie laten eindigen in de gewenste laag en daarmee een gewenste kleur zichtbaar maken. Aldus kan met een afbeelding in kleur tot stand brengen.

Verder biedt de uitvinding de mogelijkheid de perforatie aan te brengen in een op de drager bevestigd, beveiligd element, zoals een optisch variabel element, zoals een hologram of een kinegram. Dergelijke beveiligingskenmerken zijn voor een namaker niet toegankelijk, aangezien zijn slechts tussen één fabrikant en één afnemer verhandeld worden. Door een dergelijk beveiligingskenmerk bovendien te voorzien van een gepersonaliseerd perforatiepatroon wordt tevens de fraudeur de mogelijkheid ontnomen een dergelijk element van een document over te brengen naar een ander document.

Wanneer de door het perforatiepatroon gerepresenteerde afbeelding overeenkomt met een andere, op het document aangebrachte afbeelding, is het mogelijk de afbeeldingen samen te laten vallen. Dit biedt de mogelijkheid beide beelden precies samen te laten vallen. Dit heeft als voordelen: de problemen voor de fraudeur en namaker nemen toe, de verificatie wordt nog sneller en eenvoudiger en er is geen extra oppervlak vereist voor het geperforeerde beeld.

Vervolgens zal de onderhavige uitvinding worden toegelicht aan de hand van bijgaande tekeningen, waarin voorstellen:

figuur 1: een doorsnede-aanzicht van een eerste uitvoeringsvorm van een document volgens de onderhavige uitvinding;

figuur 2: een doorsnede-aanzicht van een tweede uitvoeringsvorm van een document volgens de onderhavige uitvinding;

figuur 3: een doorsnede-aanzicht van een derde uitvoeringsvorm van een document volgens de onderhavige uitvinding;

figuur 4: een doorsnede-aanzicht van een vierde uitvoeringsvorm van een document volgens de onderhavige uitvinding;

figuur 5: een doorsnede-aanzicht van een vijfde uitvoeringsvorm van een document volgens de onderhavige uitvinding;

figuur 6: een schematisch perspectivisch detailaanzicht van een zesde uitvoeringsvorm van de uitvinding;

figuur 7: een schematisch perspectivisch detailaanzicht van een zevende uitvoeringsvorm van de uitvinding;

figuur 8: een doorsnede-aanzicht van een achtste uitvoeringsvorm van de uitvinding welke tevens dient ter verduidelijking van de daarbij gebruikte werkwijze; en

figuur 9: een doorsnede-aanzicht van een negende uitvoeringsvorm van de onderhavige uitvinding.

In figuur 1 is een doorsnede getoond van een document 1. Het document 1 is van kunststof vervaardigd, doch het kan evenzeer van een ander materiaal zijn vervaardigd, zoals papier, textiel, en het kan eveneens van gelamineerd materiaal zijn vervaardigd, waarbij een combinatie van diverse materiaalsoorten wordt gemaakt.

Zoals is toegelicht in de Internationale octrooiaanvrage met publikatienummer WO98/19869, is een dergelijk document van perforaties voorzien. Bij figuur 1 zijn de perforaties 2 aangebracht. De perforaties 2 strekken zich bij deze eerste uitvoeringsvorm van de onderhavige uitvinding niet door de gehele dikte van het document 1 uit, maar zij laten een stuk 3 van het document over.

Hierbij zijn van de diverse perforaties de resterende delen 3 verschillend dik. Zij zijn dus in meerdere of mindere mate lichtdoorlatend en, wanneer het document tegen het licht wordt gehouden, zal in afhankelijkheid van de dikte van het resterende stuk 3 en de

diepte van de perforatie 2 een grijs-tinten omvattend beeld ontstaan.

Volgens een in figuur 2 afgebeelde uitvoeringsvorm zijn de perforaties schuin aangebracht, dat wil zeggen onder een van 90° verschillende hoek met het hoofdvlak van het document. Hierbij is het mogelijk een modulatie van de grijstinten te verkrijgen door het variëren van de betreffende hoek. Een en ander is verduidelijkt met stippellijnen in figuur 2.

Verder is mogelijk, zoals in figuur 3 getoond is, de breedte, dat wil zeggen de diameter van de gaten 4 te moduleren. Hierbij is het uiteraard mogelijk beide modulatievormen te combineren. Bovendien is het mogelijk een van beide modulatievormen of beide te combineren met het moduleren van de dichtheid van de perforaties.

Uiteraard is het mogelijk aan een dergelijke combinatie van modulatiemethoden bepaalde eigenschappen toe te kennen. Een voorbeeld hiervan is in figuur 4 weergegeven.

Hierbij wordt, wanneer het document recht van voren wordt bekeken, zoals met stippellijnen in figuur 5 is aangegeven, een gelijke grijstoon weergegeven voor elk van de perforaties. Op deze grijstoon kan worden gemoduleerd door het variëren van de dichtheid of door het variëren van de grootte van de perforaties. Hierbij is het volgens de uitvinding mogelijk een afbeelding te genereren.

Door het feit dat beide perforaties 4 schuin zijn aangebracht is het mogelijk deze perforaties van een extra informatie te voorzien, bijvoorbeeld door deze aan te brengen in de vorm van een letter of een logo. Dit is uiteraard alleen zichtbaar, wanneer de afbeelding onder een bepaalde hoek wordt waargenomen.

Bij de in figuur 5 weergegeven uitvoeringsvorm wordt steeds een perforatie met een kegelvorm of met de vorm van een afgeknotte kegel verkregen. Hierbij kan modulatie van de waarneembare grijstint worden verkregen door de "diepte" van de kegel of zijn tophoek te vari-

eren. Dit vormt aldus een combinatie van gatdieptemodulatie en gatdiametermodulatie. Zo is bijvoorbeeld perforatie 10 doorgaand, terwijl perforatie 11 blind is.

Verder is het mogelijk, zoals in figuur 6 getoond is, een perforatie aan te brengen in een van een cirkel afwijkende vorm, bijvoorbeeld een rechthoek 6. De rechthoekige perforatie kan moeilijk met mechanische middelen worden verkregen, zodat hiervoor een laser noodzakelijk is. Een laserbundel kan immers zodanig worden bestuurd, dat hij, mits voldoende fijn gefocusseerd, een perforatie met een dergelijke contour veroorzaakt. Het zal duidelijk zijn dat andere vormen mogelijk zijn, zoals driehoeken, vierkanten, ovalen, enz.

In figuur 7 is een configuratie getoond, waarbij dit document voorzien is van een van inkt voorziene laag 7. Deze laag treedt bij het met een laser aanbrengen van de perforatie niet bijzonder naar voren; ook deze laag wordt door de laser verwijderd. Wanneer men poogt een dergelijk document door middel van mechanische middelen, bijvoorbeeld boren, van een perforatie te voorzien, zal de inkt versmeren, hetgeen duidelijk zichtbaar is.

Overigens is een dergelijke configuratie ook van toepassing op gelamineerde kaarten, waarvan de binnenlaag een kleur, bijvoorbeeld wit, heeft die afwijkt van de kleuren van de overige lagen.

In figuur 8 is afgebeeld hoe het mogelijk is met eenzelfde laserlichtbron 8 eenzelfde document 1 in verschillende posities van een rechte perforatie 5 en vervolgens van een schuine perforatie 4 te voorzien. Uiteraard is hierbij noodzakelijk dat de laserlichtbundel 9, welke uit de laserbron 8 treedt, in voldoende mate kan worden afgebogen. Verder zijn voor de vereiste nauwkeurigheid van de plaatsbepaling van het document 2 in de verschillende posities nauwkeurige aanslagen en dergelijke, noodzakelijk. Het zal duidelijk zijn dat het mogelijk is het document vanuit meer dan twee posities te perforeren.

Tenslotte toont figuur 9 een uitvoeringsvorm waarbij de laserlichtbron 8 relatief dicht bij het document 1 is geplaatst, zodat als gevolg van de hoekafwijking perforaties ontstaan, welke zich onder een verschillende hoek uitstrekken. Verder zal het duidelijk zijn dat op talloze wijzen van de getoonde uitvoeringsvormen kan worden afgeweken binnen de onderhavige uitvinding.

CONCLUSIES

1. Tegen vervalsing bestendig document, omvattende een veiligheidskenmerk in de vorm van een perforatiepatroon dat bij beschouwing tegen een heldere achtergrond grijstinten te zien geeft, **met het kenmerk**, dat het document is vervaardigd van in een beperkte mate licht doorlatend materiaal, dat tenminste een deel van de tot het perforatiepatroon behorende perforaties zich slechts over een deel van de dikte van het document ter plaatse van de perforatie uitstrekt, en dat de dikte van het resterende deel van het document ter plaatse van de perforatie volgens het weer te geven beeld is gemoduleerd.

2. Tegen vervalsing bestendig document, omvattende een veiligheidskenmerk in de vorm van een perforatiepatroon dat bij beschouwing tegen een heldere achtergrond grijstinten te zien geeft, **met het kenmerk,** dat tenminste een deel van de tot het perforatiepatroon behorende perforaties zich onder een van 90° verschillende hoek ten opzichte van het hoofdvlak van het document uitstrekt.

3. Document volgens conclusie 2, **met het kenmerk**, dat voor het verkrijgen van de afbeelding de hoek is gemoduleerd.

4. Document volgens conclusie 2 of 3, **met het kenmerk**, dat voor het verkrijgen van de afbeelding de dichtheid of de diameter van de perforatie is gemoduleerd.

5. Document volgens een van de voorafgaande conclusies, **met het kenmerk**, dat de perforatie een afbeelding representeert.

6. Tegen vervalsing bestendig document, omvattende een veiligheidskenmerk in de vorm van een perforatiepatroon dat een afbeelding representeert en dat bij beschouwing tegen een heldere achtergrond grijstinten te zien geeft, **met het kenmerk**, dat in de perforaties materiaal is aangebracht.

7. Document volgens conclusie 6, **met het kenmerk**, dat het materiaal wordt gevormd door onder UV-licht oplichtende inkt.

8. Document volgens conclusie 6, **met het kenmerk**, dat in de perforaties een opgedampt metaallaagje is aangebracht.

9. Document volgens een van de voorafgaande conclusies, **met het kenmerk**, dat het document verschillend gekleurde materiaallagen omvat, waarbij, in afhankelijkheid van de diepte van de perforatie een kleur zichtbaar is.

10. Document volgens conclusie 9, **met het kenmerk**, dat het document van kunststoflaminaat is vervaardigd, en dat de kernlaag een van de overige lagen afwijkende kleur heeft.

11. Document volgens een van de voorafgaande conclusies, **met het kenmerk**, dat het perforatiepatroon verder is voorzien van in dichtheid of in grootte gemoduleerde perforaties.

12. Document volgens een van de voorafgaande conclusies, **met het kenmerk**, dat het perforatiepatroon lokaal is voorzien van een van de rest van het perforatiepatroon afwijkend perforatiepatroon.

13. Document volgens conclusie 3, 4, 5, 6 of 7, **met het kenmerk**, dat het perforatiepatroon is ingericht voor het vanaf een beschouwingspositie aan de waarnemer presenteren van een stereobeeld.

14. Document volgens conclusie 3, 4, 5, 6 of 7, **met het kenmerk**, dat het perforatiepatroon is ingericht voor het aan de gebruiker presenteren van een per gezichtshoek verschillend beeld.

15. Document volgens conclusie 14, **met het kenmerk**, dat de hoek van de perforaties met het hoofdvlak van het document toeneemt met een toenemende afstand tot het centrum van het perforatiepatroon.

16. Document volgens een van de voorafgaande conclusies, **met het kenmerk**, dat de doorsnede van de perforatie in zijn dwarsvlak ongelijk is aan een cirkel.

17. Document volgens een van de voorafgaande conclusies, **met het kenmerk**, dat in de representatie van een beeld een code is verscholen.

18. Document volgens een van de voorafgaande conclusies, **met het kenmerk**, dat in de drager een tussenliggende laag met een inkt is opgenomen.

19. Document volgens conclusie 18, **met het kenmerk**, dat de inkt slechts bij UV-licht zichtbare inkt is.

20. Document volgens een van de voorafgaande conclusies, **met het kenmerk**, dat de perforatie is ingebracht in een op de drager bevestigd, beveiligd element, zoals een optisch variabel element.

21. Document volgens een van de voorafgaande conclusies, waarbij de door het perforatiepatroon gerepresenteerde afbeelding overeenkomt met een door middel van grafische technieken, lasergraveertechniek of een foto aangebrachte afbeelding, **met het kenmerk**, dat beide afbeeldingen samenvallen.

22. Document volgens conclusie 21, **met het kenmerk**, dat de afbeeldingen gepersonificeerd zijn.

23. Werkwijze voor het aanbrengen van een perforatiepatroon in een document volgens conclusie 3 of een van de van conclusie 3 afhankelijke conclusies, waarbij de perforaties door een laser zijn aangebracht, **met het kenmerk**, dat het document in ten minste twee verschillende posities door een laserbron wordt bewerkt.

24. Werkwijze voor het aanbrengen van een perforatiepatroon in een document volgens conclusie 16, **met het kenmerk**, dat het document in een enkele positie vanuit een enkele laserbron wordt bewerkt.

25. Werkwijze voor het aanbrengen van een perforatiepatroon in een document volgens conclusie 9, **met het kenmerk**, dat aanvankelijk op het document een laag wordt aangebracht, vervolgens de perforatie wordt aangebracht, daarna het document aan een opdampproces wordt onderworpen en ten slotte de folie wordt verwijderd.

UITTREKSEL

De uitvinding betreft een tegen vervalsing bestendig document, omvattende een veiligheidskenmerk in de vorm van een perforatiepatroon dat bij beschouwing tegen een heldere achtergrond grijstinten te zien geeft, waarbij het document is vervaardigd van in een beperkte mate licht doorlatend materiaal, dat tenminste een deel van de tot het perforatiepatroon behorende perforaties zich slechts over een deel van de dikte van het document ter plaatse van de perforatie uitstrekt, en dat de dikte van het resterende deel van het document ter plaatse van de perforatie volgens het weer te geven beeld is gemoduleerd.

Tevens betreft de uitvinding een dergelijk document, omvattende een veiligheidskenmerk in de vorm van een perforatiepatroon dat bij beschouwing tegen een heldere achtergrond grijstinten te zien geeft, waarbij tenminste een deel van de tot het perforatiepatroon behorende perforaties zich onder een van 90° verschillende hoek ten opzichte van het hoofdvlak van het document uitstrekt.

5

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
G PEM/MvZ/13		
International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/NL00/00036	18/01/2000	21/01/1999
International Patent Classification (IPC) or national classification and IPC B42D15/00		
Applicant INDUSTRIAL AUTOMATION INTEGRATORS (IAC) B.V. et al		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 7 sheets, including this cover sheet.

   ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of 2 sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the report
   - II ☐ Priority
   - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV ☒ Lack of unity of invention
   - V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations suporting such statement
   - VI ☐ Certain documents cited
   - VII ☒ Certain defects in the international application
   - VIII ☒ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
16/08/2000	18.04.2001
Name and mailing address of the international preliminary examining authority: European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Louka, M Telephone No. +49 89 2399 2388

Form PCT/IPEA/409 (cover sheet) (January 1994)

PATENT COOPERATION TREATY

PCT

21.8.00 - Ok II

21.9.00 - ON FR. FAS

NOTICE INFORMING THE APPLICANT OF THE COMMUNICATION OF THE INTERNATIONAL APPLICATION TO THE DESIGNATED OFFICES

(PCT Rule 47.1(c), first sentence)

From the INTERNATIONAL BUREAU

T :
EVELEENS MAARSE, Pieter
Arnold & Siedsma
Sweelinckplein 1
NL-2517 GK The Hague
PAYS-BAS

04 AUG. 2000

Date of mailing (day/month/year) 27 July 2000 (27.07.00)	
Applicant's or agent's file reference G PEM/MvZ/13	IMPORTANT NOTICE

International application No.	International filing date (day/month/year)	Priority date (day/month/year)
PCT/NL00/00036	18 January 2000 (18.01.00)	21 January 1999 (21.01.99)

Applicant
INDUSTRIAL AUTOMATION INTEGRATORS (IAI) B.V. et al

1. Notice is hereby given that the International Bureau has communicated, as provided in Article 20, the international application to the following designated Offices on the date indicated above as the date of mailing of this Notice:
   JP,US

   In accordance with Rule 47.1(c), third sentence, those Offices will accept the present Notice as conclusive evidence that the communication of the international application has duly taken place on the date of mailing indicated above and no copy of the international application is required to be furnished by the applicant to the designated Office(s).

2. The following designated Offices have waived the requirement for such a communication at this time:
   CA,CN,EP,RU

   The communication will be made to those Offices only upon their request. Furthermore, those Offices do not require the applicant to furnish a copy of the international application (Rule 49.1(a-bis)).

3. Enclosed with this Notice is a copy of the international application as published by the International Bureau on
   27 July 2000 (27.07.00) under No. WO 00/43216

REMINDER REGARDING CHAPTER II (Article 31(2)(a) and Rule 54.2)

If the applicant wishes to postpone entry into the national phase until 30 months (or later in some Offices) from the priority date, a demand for international preliminary examination must be filed with the competent International Preliminary Examining Authority before the expiration of 19 months from the priority date.

It is the applicant's sole responsibility to monitor the 19-month time limit.

Note that only an applicant who is a national or resident of a PCT Contracting State which is bound by Chapter II has the right to file a demand for international preliminary examination.

REMINDER REGARDING ENTRY INTO THE NATIONAL PHASE (Article 22 or 39(1))

If the applicant wishes to proceed with the international application in the national phase, he must, within 20 months or 30 months, or later in some Offices, perform the acts referred to therein before each designated or elected Office.

For further important information on the time limits and acts to be performed for entering the national phase, see the Annex to Form PCT/IB/301 (Notification of Receipt of Record Copy) and Volume II of the PCT Applicant's Guide.

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Facsimile N . (41-22) 740.14.35

Authorized officer
J. Zahra

Telephone No. (41-22) 338.83.38

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/NL00/00036

I. Basis of the report

1. With regard to the **elements** of the international application *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17))*:
Description, pages:

1-8	as originally filed				

Claims, No.:

1-22	as originally filed				
23-25	as received on	02/03/2001	with letter of	01/03/2001	

Drawings, sheets:

1/1	as originally filed				

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

   These elements were available or furnished to this Authority in the following language: , which is:

   - ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
   - ☐ the language of publication of the international application (under Rule 48.3(b)).
   - ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

   - ☐ contained in the international application in written form.
   - ☐ filed together with the international application in computer readable form.
   - ☐ furnished subsequently to this Authority in written form.
   - ☐ furnished subsequently to this Authority in computer readable form.
   - ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
   - ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

   (Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

IV. Lack of unity of invention

1. In response to the invitation to restrict or pay additional fees the applicant has:

   - ☐ restricted the claims.
   - ☐ paid additional fees.
   - ☒ paid additional fees under protest.
   - ☐ neither restricted nor paid additional fees.

2. ☐ This Authority found that the requirement of unity of invention is not complied and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is

   - ☐ complied with.
   - ☒ not complied with for the following reasons:
     see separate sheet

4. Consequently, the following parts of the international application were the subject of international preliminary examination in establishing this report:

   - ☒ all parts.
   - ☐ the parts relating to claims Nos. .

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims 1-25
	No:	Claims

Inventive step (IS)	Yes:	Claims	1-25
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-25
	No:	Claims	

2. Citations and explanations
see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:
see separate sheet

Section IV

Claim 1 specifies a forge-proof document with a security feature in the form of a perforation pattern, the document being manufactured from a material which transmits light to a limited extent, with at least some of the perforations **extending only a part** of the thickness of the document and with the thickness of the remaining part at the position of the perforation being **modulated** in accordance with the image to be displayed.
Claim 2 specifies a forge-proof document with a security feature in the form of a perforation pattern with at least some of the perforations extending **at an angle differing from 90°** relative to the main plane of the document.
Claim 6 specifies a forge-proof document with a security feature in the form of a perforation pattern **with material arranged in the perforations.**
Hence it is clear that the three above separate inventions are not so linked as to form a single general inventive concept.
In the application there are therefore the following three groups of inventions:
Group A: Claims 1, 9-12,16-24, Group B: Claims 2-5, 9-22, 24,25, Group C: Claims 6-22, 24,25.

Section V

Document WO-A-9 819 869 (=D1), which is considered to represent the most relevant state of the art, discloses (cf. claims 1, 2,11; figs. 1, 2) a forge-proof document from which the subject-matter of claim 1 differs in that the document is manufactured from a material which transmits light to a limited extent, that at least some of the perforations forming part of the perforation pattern extend over only a part of the thickness of the document at the position of the perforation and that the thickness of the remaining part of the document at the position of the perforation is modulated in accordance with the image to be displayed.
These distinguishing features are neither disclosed nor suggested by the available prior art and solve in a non-obvious way the problem of increasing the degree of difficulty against forgery.
The subject-matter of claim 1 is therefore conforming with the requirements of

Art. 33(2), (3) PCT.

D1 also discloses a forge-proof document having all the features of the preamble of claim 2.
The remaining features of claim 2 are neither disclosed nor suggested by any of the available prior art documents and solve in a non-obvious way the problem of increasing the degree of difficulty against forgery.
The subject-matter of claim 2 is therefore conforming with the requirements of Art. 33(2), (3) PCT.

Finally D1 discloses a forge-proof document having all the features of the preamble of claim 6.
The remaining features of claim 6 are neither disclosed nor suggested by any of the available prior art documents and solve in a non-obvious way the problem of increasing the degree of difficulty against forgery.
The subject-matter of claim 6 is therefore conforming with the requirements of Art. 33(2), (3) PCT.

The method claims 23, 24 and 25 are also conforming with the requirements of Art. 33 (2), (3) PCT as they specify the method steps for manufacturing the forge-proof document of claims 1 or 2, 16 and 6 respectively.

Section VII
The features of the claims are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).

Section VIII

Claims 24 and 25 refer to a "first" image although there is no second image specified therein.
This results to ambiguity to the scope of these claims.

Claims 23, 25 and 25 refer to "images" which have not been specified as "perforation patterns", see e.g. page 3, fourth paragraph, and hence leave doubt

as to what images are meant.

Finally, in claim 25, the "vapour deposition process" should have been specified as "providing the inner sides of the perforations with a layer", see page 4, lines 18-24.

NEW CLAIMS

23. Method for arranging a perforation pattern in a forge-proof document comprising a security feature in the form of a perforation pattern which displays grey tones when viewed against a bright background, the method comprising the following steps:

- arranging the document to be provided of a perforation pattern in a postion in which it can be irradiated by a laser source; and
- irradiating the document by a laser source which is controlled to obtain a first image in the document,

characterized by:

- amending the relative position of the document and the laser source; and
- subsequently irradiating the document by said laser source which is controlled to obtain a second image.

24. Method for arranging a perforation pattern in a forge-proof document comprising a security feature in the form of a perforation pattern which displays grey tones when vieuwed against a bright background, the method comprising the following steps:

- arranging the document to be provided of a perforation pattern in a postion in which it can be irradiated by a laser source; and
- irradiating the document by a laser source which is controlled to obtain a first image in the document,

characterized in that the laser source is programmed to apply a perforation pattern comprising perforations of which the cross-section in the transverse plane of the perforation pattern is unequal to a circle.

25. Method for arranging a perforation pattern in a forge-proof document comprising a security feature in the form of a perforation pattern which displays grey tones

when vieuwed against a bright background, the method comprising the following steps:

- applying a foil on the document to be provided of a perforation pattern;
- arranging the document in a position in which it can be irradiated by a laser source; and
- irradiating the document by a laser source which is controlled to obtain a first image in the document,

characterized in that

- subsequently the document is subjected to a vapor deposition process; and
- finally the foil is removed from the document.

ENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference	FOR FURTHER ACTION	see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.
G PEM/MvZ/13		
International application No.	International filing date *(day/month/year)*	(Earliest) Priority Date *(day/month/year)*
PCT/NL 00/ 00036	18/01/2000	21/01/1999
Applicant		
INDUSTRIAL AUROMATION INTEGRATORS (IAC) B.V. et al		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 2 sheets.

[X] It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**

   a. With regard to the **language,** the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

   [ ] the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

   b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

   [ ] contained in the international application in written form.

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   [ ] furnished subsequently to this Authority in written form.

   [ ] furnished subsequently to this Authority in computer readble form.

   [ ] the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

   [ ] the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. [ ] **Certain claims were found unsearchable** (See Box I).

3. [ ] **Unity of invention is lacking** (see Box II).

4. With regard to the **title,**

   [ ] the text is approved as submitted by the applicant.

   [X] the text has been established by this Authority to read as follows:

   SECURITY DOCUMENT WIH A PERFORATION PATTERN

5. With regard to the **abstract,**

   [X] the text is approved as submitted by the applicant.

   [ ] the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No. 1

   [X] as suggested by the applicant.

   [ ] because the applicant failed to suggest a figure.

   [ ] because this figure better characterizes the invention.

   [ ] None of the figures.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/NL 00/00036

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 B42D15/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 B42D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 98 19869 A (INDUSTRIAL AUTOMATION INTEGRATORS) 14 May 1998 (1998-05-14) cited in the application the whole document	1,2,6,23

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

° Special categories of cited documents :

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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
8 May 2000	15/05/2000

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax: (+31–70) 340–3016	Evans, A

1

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/NL 00/00036

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9819869 A	14-05-1998	NL 1004433 C	08-05-1998
		CN 1236345 A	24-11-1999
		EP 0936975 A	25-08-1999

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(71) Applicants *(for all designated States except US)*: INDUSTRIAL AUTOMATION INTEGRATORS (IAI) B.V. [NL/NL]; De Run 6509, NL–5504 DR Veldhoven (NL). ENSCHEDÉ/SDU B.V. [NL/NL]; Jan van Krimpenweg 19, NL–2031 CG Haarlem (NL).

(72) Inventors; and

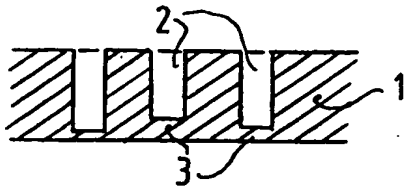
(75) Inventors/Applicants *(for US only)*: COBBEN, Johannes, Ignatius, Marie [NL/NL]; Berthastraat 11, NL–5507 LT Veldhoven (NL). AUGUSTINUS, Arnoud [NL/NL]; Heilige Geeststraat 2, NL–5521 LC Eersel (NL). VAN DEN BERG, Jan [NL/NL]; Bloklandpolderstraat 15, NL–2807 LH Gouda (NL).

(74) Agent: EVELEENS MAARSE, Pieter; Arnold & Siedsma, Sweelinckplein 1, NL–2517 GK The Hague (NL).

(54) Title: SECURITY DOCUMENT WITH A PERFORATION PATTERN

(57) Abstract

The invention relates to a forge–proof document comprising a security feature in the form of a perforation pattern which displays grey tones when viewed against a bright background, wherein the document is manufactured from a material which transmits light to a limited extent, at least some of the perforations forming part of the perforation pattern extend over only a part of the thickness of the document at the position of the perforation, and the thickness of the remaining part of the document at the position of the perforation is modulated in accordance with the image to be displayed. The invention also relates to such a document comprising a security feature in the form of a perforation pattern which displays grey tones when viewed against a bright background, wherein at least some of the perforations forming part of the perforation pattern extend at an angle differing from 90° relative to the main plane of the document.



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SECURITY DOCUMENT WITH A PERFORATION PATTERN

The present invention relates to a forge-proof document comprising a security feature in the form of a perforation pattern which displays grey tones when viewed against a bright background.

Such a document is known from WO98/19869.

Although the prior art document in question provides a very good security against forgery, it is important to develop new security features in respect of the technical potential of forgers.

For this purpose the present invention provides the measure that the document is manufactured from a material which transmits light to a limited extent, that the perforation extends over only a part of the thickness of the document at the position of the perforation, and that the thickness of the remaining part of the document at the position of the perforation is modulated in accordance with the image to be displayed.

This measure results in a further degree of difficulty; the determining factor for displaying the grey tone of the perforation, and therewith the image, is determined by the remaining thickness of the document. This means that the depth of the non-continuous perforation must be determined very precisely. The resulting thickness is after all the difference between two larger values, i.e. the thickness of the total document and the depth of the perforation.

According to another independent measure according to the invention, the perforation extends at an angle differing from 90° relative to the main plane of the document. This has the result that the perforation cannot be arranged with very small drills, but that use will have to be made of a laser, which on the one hand

requires a large investment and on the other requires a high degree of technical knowledge.

This method of arranging provides the option of modulating the angle so as to obtain a grey-value modulation.

There is moreover the possibility, as in the classic straight perforations, of modulating the density of the perforation or the size, i.e. the diameter, thereof.

The perforation is preferably an image.

It is herein noted that the image as arranged by means of perforation can be subjected to a certain degree of image-processing. It is hereby possible to compensate the features of the image lost due to the necessary quantization. An example of such an image-processing is "contour enhancement".

The invention is also applicable to perforation patterns which do not represent an image, but which represent an alphanumeric expression or a code.

It will be apparent that a combination of these possibilities can be applied. Such an oblique perforation can of course be combined with a normal straight perforation. This combination provides the option of introducing an extra pattern. The main image, which is modulated in order to display grey tones, is for instance arranged herein with a straight perforation, while an additional feature, for instance in the form of a logo or letters, is arranged obliquely. The choice of the angle or other properties of the oblique perforation can be chosen such that during normal observation of the pattern at an angle of about 90° the normal image appears, and that during observation at another angle the second image in the form of a logo or a letter combination becomes visible.

Another example is the arranging of two images at the same position on the carrier, although at different angles such that each eye sees its own image, and a stereo image is thus observed.

It will be apparent that this can be varied in numerous ways.

It is attractive herein to make use of a method wherein the document to be protected is irradiated by a laser source from two positions. It is of course possible herein to make use of two laser sources, although it is of course simpler to first irradiate the document in a first position with a laser source at a first angle and to then place the document in a different position wherein it is irradiated by the same laser source at a different angle.

When the laser source is placed close to document, it is also possible to arrange a perforation at an angle differing from 90°; this is caused by the cone or pyramid shape inside which the laser light beam must displace in order to arrange the perforation. A pattern then results which has an increasing angle as the distance to the centre of the image increases.

According to another preferred embodiment of the invention the cross-section of the perforation in its transverse plane is unequal to a circle. The use of a laser source provides the possibility of performing such a perforation when there is a correct control of the positions of the laser spot. It is in any case practically impossible to obtain this with mechanical means in view of the fineness of the required pattern.

According to another preferred embodiment a code is concealed in the representation of the image. Use can be made herein of the teachings already applied in graphic techniques, according to which it is possible to arrange changes in an image which are not visible to the normal eye and which result after a specific processing in a code being displayed.

Conversely, an immediately visible coding can also be chosen. The code can be used for instance to identify the machine on which the relevant product was made. The relevant machine can thus be identified in the case of improper use of a machine.

According to yet another embodiment an intermediate layer is arranged in the document, which layer is provided with an ink.

The use of laser provides the possibility of complete removal, i.e. burning, evaporating and so on, of the material from which the document is manufactured. Contamination of the relevant layers of the document will herein hardly occur. When such a document is processed with mechanical means, a degree of smearing will occur.

This smearing can be observed particularly well when the ink is formed by ink sensitive in UV light.

According to another embodiment, perforations arranged in a carrier in a pattern representing an image are filled with an ink which lights up under UV light. Such a pattern becomes visible if it is illuminated with a UV light source.

In another embodiment the inner sides of the perforations of such a pattern are provided with a layer, for instance by vapour-deposition of a reflecting metal layer, resulting in an image which is visible when viewed. Selective application of a layer to the inner side of all perforations is possible by arranging a removable foil before the perforations are arranged and removing it after said layer has been applied.

In another embodiment the starting point is a carrier which is built up of material layers of different colours. By modulating the depth the perforation can be made to end in the desired layer and thereby make a desired colour visible. An image in colour can thus be realized.

The invention further provides the option of arranging the perforation in a protected element mounted on the carrier, such as an optically variable element such as a hologram or a kinegram. Such security features are not accessible to a forger, since they are only transacted between one manufacturer and one buyer. By furthermore providing such a security feature with a personalized perforation pattern, the forger is also

deprived of the possibility of transferring such an element from one document to another.

When the image represented by the perforation pattern corresponds with another image arranged on the document, it is possible to have the images coincide. This provides the option of having both images coincide precisely. This has as advantages: the problems for the forger and counterfeiter increase, verification becomes even faster and simpler, and no extra surface area is required for the perforated image.

The present invention will be elucidated hereinbelow with reference to the annexed drawings, in which:

figure 1 shows a cross-sectional view of a first embodiment of a document according to the present invention;

figure 2 shows a cross-sectional view of a second embodiment of a document according to the present invention;

figure 3 shows a cross-sectional view of a third embodiment of a document according to the present invention;

figure 4 is a cross-sectional view of a fourth embodiment of a document according to the present invention;

figure 5 is a cross-sectional view of a fifth embodiment of a document according to the present invention;

figure 6 shows a schematic perspective detail view of a sixth embodiment of the invention;

figure 7 is a schematic perspective detail view of a seventh embodiment of the invention;

figure 8 is a cross-sectional view of an eighth embodiment of the invention, which also serves to elucidate the method used therein; and

figure 9 shows a cross-sectional view of a ninth embodiment of the present invention.

Figure 1 shows a cross-section of a document 1. Document 1 is manufactured from plastic but can likewise be manufactured from another material, such as paper, textile, and it can also be manufactured from laminated material, wherein a combination of diverse material types is made.

As elucidated in the international patent application with publication number WO98/19869, such a document is provided with perforations. In figure 1 the perforations 2 have been arranged. In this first embodiment of the present invention perforations 2 do not extend through the whole thickness of document 1 but leave a part 3 of the document intact.

The remaining parts 3 of the diverse perforations are herein of differing thickness. They therefore transmit light to a greater or lesser extent and, when the document is held against the light, an image comprising grey tones will result subject to the thickness of the remaining part 3 and the depth of perforation 2.

According to an embodiment as shown in figure 2, the perforations are arranged obliquely, i.e. at an angle differing from 90° relative to the main plane of the document. It is herein possible to obtain a modulation of the grey tones by varying the relevant angle. This is elucidated with dotted lines in figure 2.

It is further possible as shown in figure 3 to modulate the width, i.e. the diameter of holes 4. It is of course possible here to combine both forms of modulation. It is moreover possible to combine one of the two modulation forms or both of them with modulation of the density of the perforations.

It is of course possible to assign determined properties to such a combination of modulation methods. An example hereof is shown in figure 4.

When the document is viewed straight on, as indicated with dotted lines in figure 3, a similar grey tone is herein displayed for each of the perforations.

This grey tone can be modulated by varying the density or by varying the size of the perforations. It is herein possible according to the invention to generate an image.

Owing to the fact that both perforations 4 are arranged obliquely, it is possible to provide these perforations with extra information, for instance by arranging them in the form of a letter or a logo. This is of course only visible when the image is viewed at a determined angle.

In the embodiment shown in figure 5 a perforation in the form of a cone or in the form of a truncated cone is obtained in both cases. Modulation of the visible grey tone can herein be obtained by varying the "depth" of the cone or its apex angle. This thus forms a combination of depth of hole modulation and diameter of hole modulation. Perforation 10 is thus for instance continuous, while perforation 11 is blind.

It is further possible, as shown in figure 6, to arrange a perforation in a form differing from a circle, for instance a rectangle 6. The rectangular perforation can be difficult to obtain with mechanical means, so that a laser is necessary for this purpose. A laser beam can after all be controlled such that it causes a perforation with such a contour, provided the focussing is sufficiently fine. It will be apparent that other shapes are possible, such as triangles, squares, ovals and so on.

Figure 7 shows a configuration wherein this document is provided with layer 7 provided with ink. This layer is not particularly noticeable when the perforation is arranged with a laser; this layer is also removed by the laser. When an attempt is made to provide such a document with a perforation by means of mechanical means, for instance drilling, the ink will smear, which is clearly visible.

Such a configuration can also be applied to laminated cards, the inner layer of which has a colour,

for instance white, which differs from the colours of the other layers.

Figure 8 shows how it is possible, using the same laser light source 8, to provide the same document 1 in different positions with a straight perforation 5 and subsequently with an oblique perforation 4. It is of course essential herein that the laser light beam 9 leaving laser source 8 can be deflected sufficiently. In addition, accurate stops and the like are necessary for the required precision in the positioning of document 2 in the different positions. It will be apparent that it is possible to perforate the document from more than two positions.

Finally, figure 9 shows an embodiment wherein laser light source 8 is placed relatively close to document 1, so that as a result of the angular deviation there result perforations which extend at a different angle. It will further be apparent that it is possible within the scope of the present invention to vary in countless ways from the shown embodiments.

CLAIMS

1. Forge-proof document comprising a security feature in the form of a perforation pattern which displays grey tones when viewed against a bright background, **characterized in that** the document is manufactured from a material which transmits light to a limited extent, that at least some of the perforations forming part of the perforation pattern extend over only a part of the thickness of the document at the position of the perforation, and that the thickness of the remaining part of the document at the position of the perforation is modulated in accordance with the image to be displayed.

2. Forge-proof document comprising a security feature in the form of a perforation pattern which displays grey tones when viewed against a bright background, **characterized in that** at least some of the perforations forming part of the perforation pattern extend at an angle differing from 90° relative to the main plane of the document.

3. Document as claimed in claim 2, **characterized in that** the angle is modulated in order to obtain the image.

4. Document as claimed in claim 2 or 3, **characterized in that** the density or the diameter of the perforation is modulated in order to obtain the image.

5. Document as claimed in any of the foregoing claims, **characterized in that** the perforation represents an image.

6. Forge-proof document comprising a security feature in the form of a perforation pattern which represents an image and which displays grey tones when viewed against a bright background, **characterized in that** material is arranged in the perforations.

7. Document as claimed in claim 6, **characterized in that** the material is formed by ink which lights up under UV light.

8. Document as claimed in claim 6, **characterized in that** a vapour-deposited metal layer is arranged in the perforations.

9. Document as claimed in any of the foregoing claims, **characterized in that** the document comprises differently coloured material layers, wherein a colour is visible depending on the depth of the perforation.

10. Document as claimed in claim 9, **characterized in that** the document is manufactured from plastic laminate and that the core layer has a colour differing from the other layers.

11. Document as claimed in any of the foregoing claims, **characterized in that** the perforation pattern is further provided with perforations modulated in density or size.

12. Document as claimed in any of the foregoing claims, **characterized in that** the perforation pattern is provided locally with a perforation pattern differing from the rest of the perforation pattern.

13. Document as claimed in claim 3, 4, 5, 6 or 7, **characterized in that** the perforation pattern is adapted to present a stereo image to the observer from a viewing position.

14. Document as claimed in claim 3, 4, 5, 6 or 7, **characterized in that** the perforation pattern is adapted to present to the user an image which differs per angle of view.

15. Document as claimed in claim 14, **characterized in that** the angle of the perforations to the main plane of the document increase as the distance to the centre of the perforation pattern increases.

16. Document as claimed in any of the foregoing claims, **characterized in that** the cross-section of the perforation pattern in its transverse plane is unequal to a circle.

17. Document as claimed in any of the foregoing claims, **characterized in that** a code is concealed in the representation of an image.

18. Document as claimed in any of the foregoing claims, **characterized in that** an intermediate layer with an ink is arranged in the carrier.

19. Document as claimed in claim 18, **characterized in that** the ink is only visible ink in UV light.

20. Document as claimed in any of the foregoing claims, **characterized in that** the perforation is arranged in a protected element mounted on the carrier, such as an optically variable element.

21. Document as claimed in any of the foregoing claims, wherein the image represented by the perforation pattern corresponds with an image applied by means of graphic techniques, laser engraving technique or a photo, **characterized in that** both images coincide.

22. Document as claimed in claim 21, **characterized in that** the images are personalized.

23. Method for arranging a perforation pattern in a document as claimed in claim 3 or any of the claims dependent on claim 3, wherein the perforations are arranged by a laser, **characterized in that** the document is processed in at least two different positions by a laser source.

24. Method for arranging a perforation pattern in a document as claimed in claim 16, **characterized in that** the document is processed in a single position from a single laser source.

25. Method for arranging a perforation pattern in a document as claimed in claim 9, **characterized in that** a layer is first arranged on the document, the perforation is subsequently arranged, the document is then subjected to a vapour deposition process and finally the foil is removed.

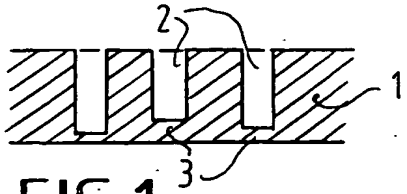

FIG.1

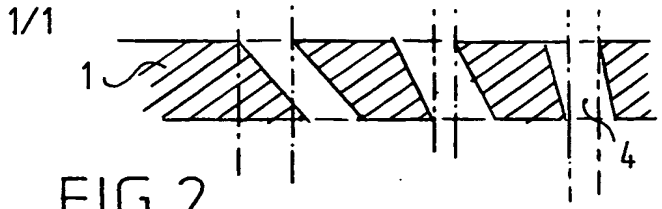

FIG.2

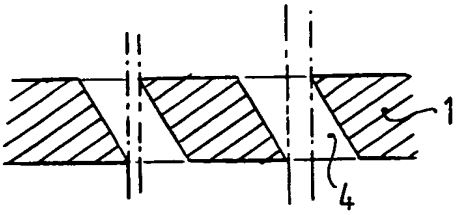

FIG.3

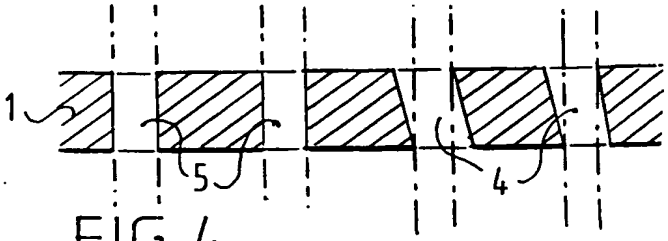

FIG.4

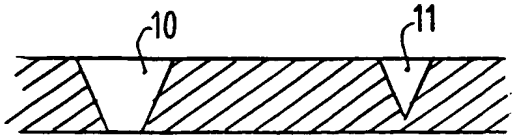

FIG.5

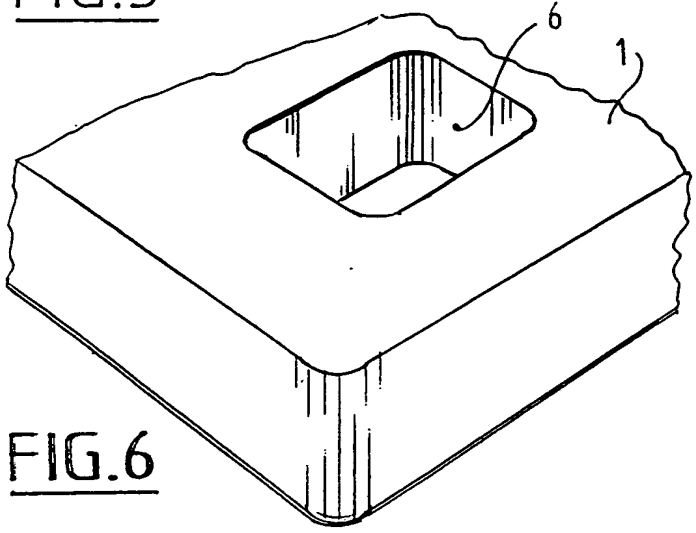

FIG.6

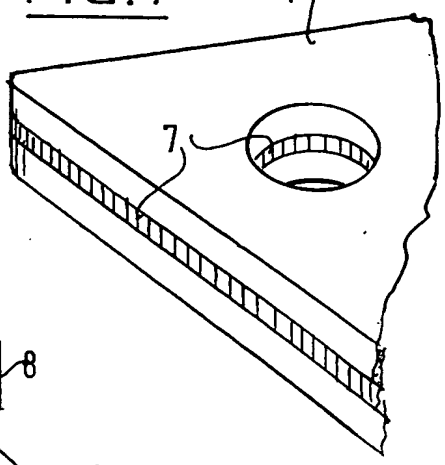

FIG.7

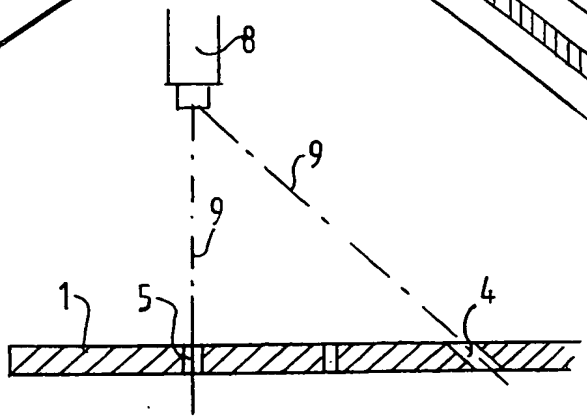

FIG.8

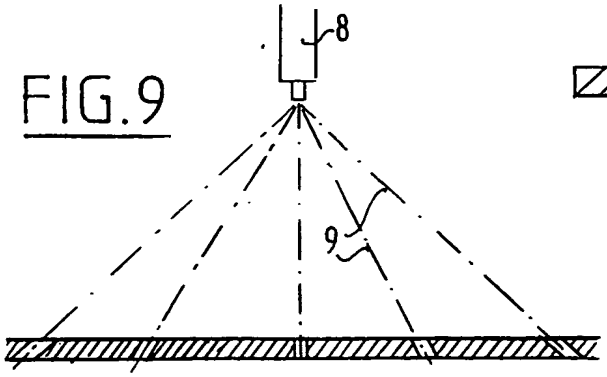

FIG.9

INTERNATIONAL SEARCH REPORT

International Application No
PCT/NL 00/00036

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 B42D15/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 B42D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 98 19869 A (INDUSTRIAL AUTOMATION INTEGRATORS) 14 May 1998 (1998-05-14) cited in the application the whole document	1,2,6,23

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
8 May 2000	15/05/2000

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax: (+31–70) 340–3016	Evans, A

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/NL 00/00036

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9819869 A	14-05-1998	NL 1004433 C	08-05-1998
		CN 1236345 A	24-11-1999
		EP 0936975 A	25-08-1999